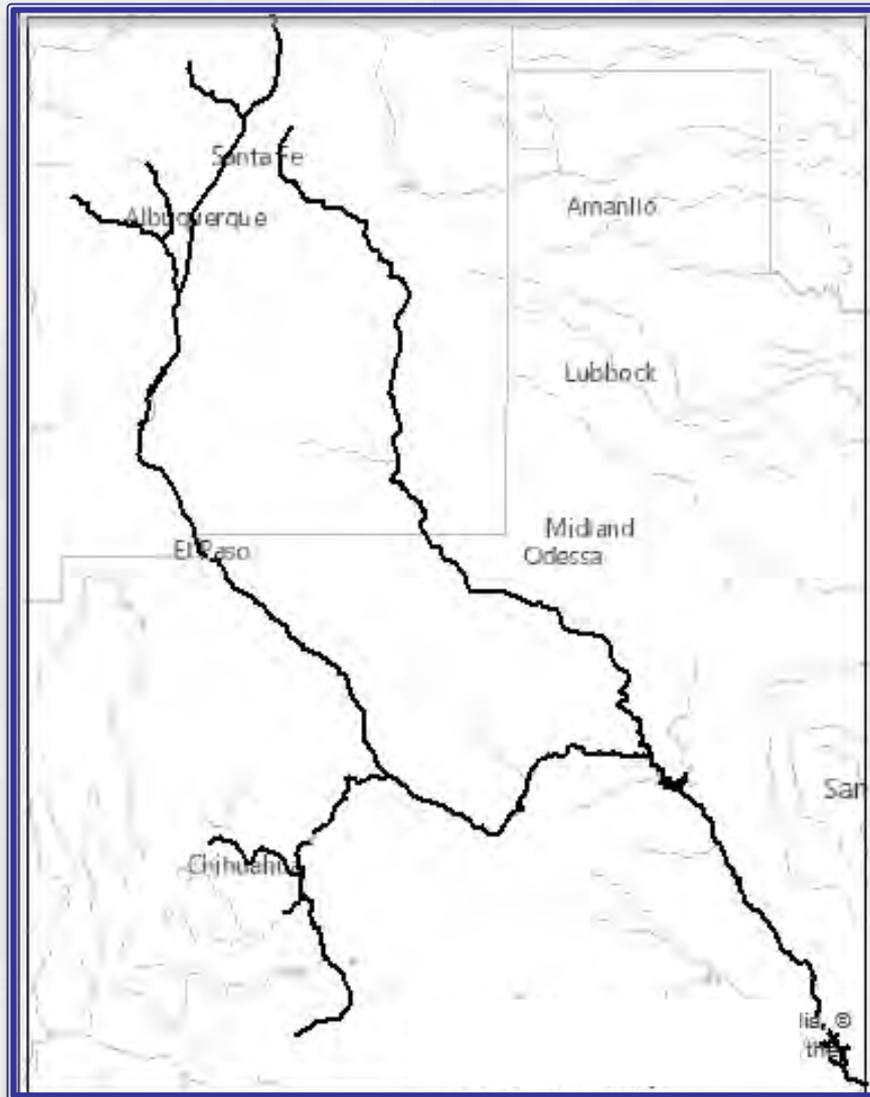


The Rio Grande

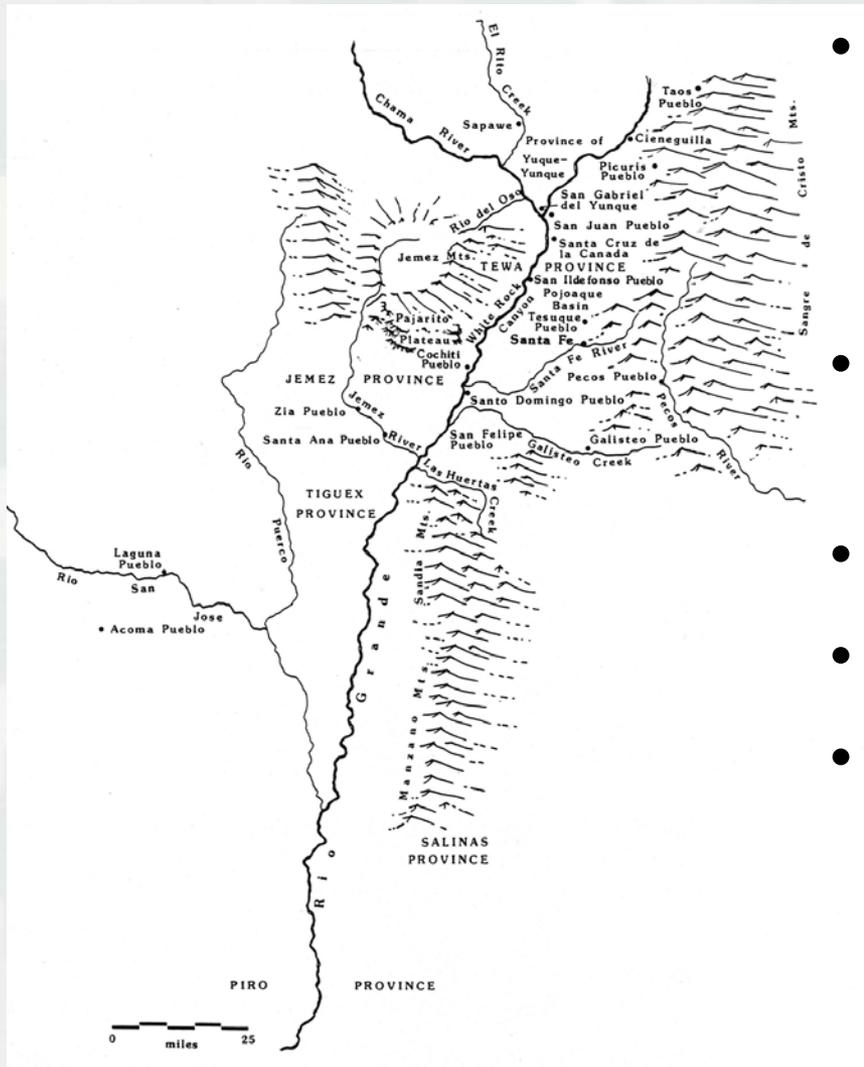


Nestedness and interdependence of hydrological, geomorphic, ecological, and biogeochemical processes – Polvi et al. 2020

Heterogeneity of ecosystem function – DeBoer et al. 2020



Native Americans

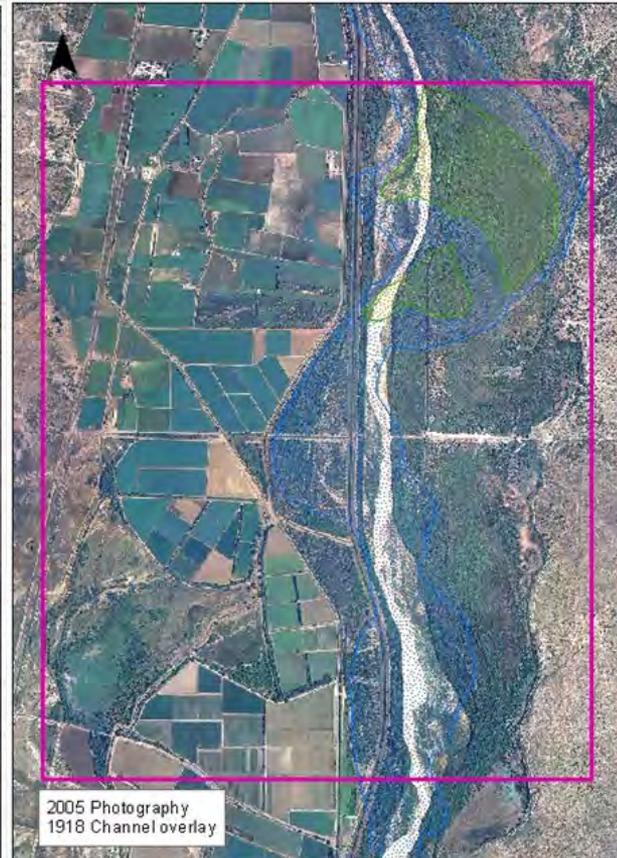
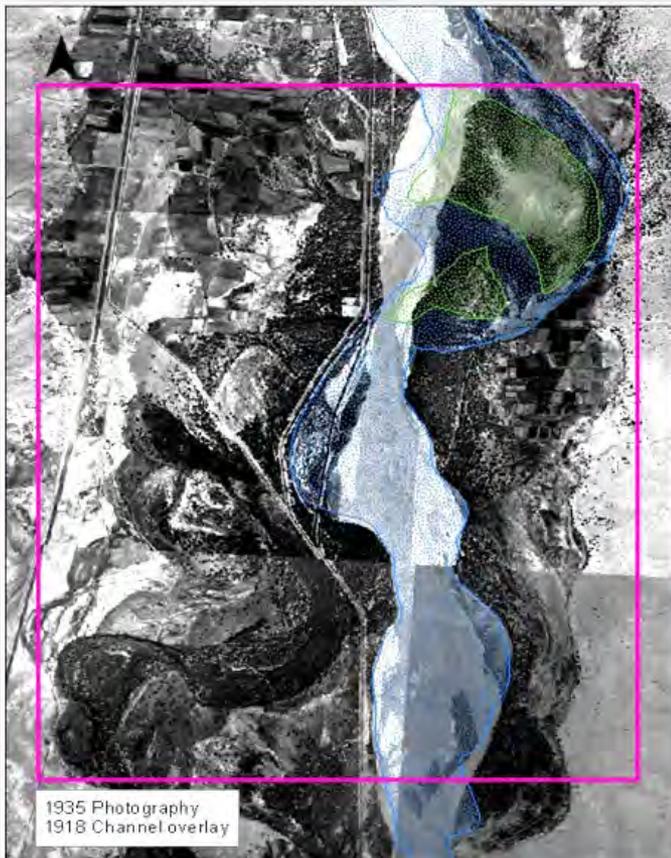


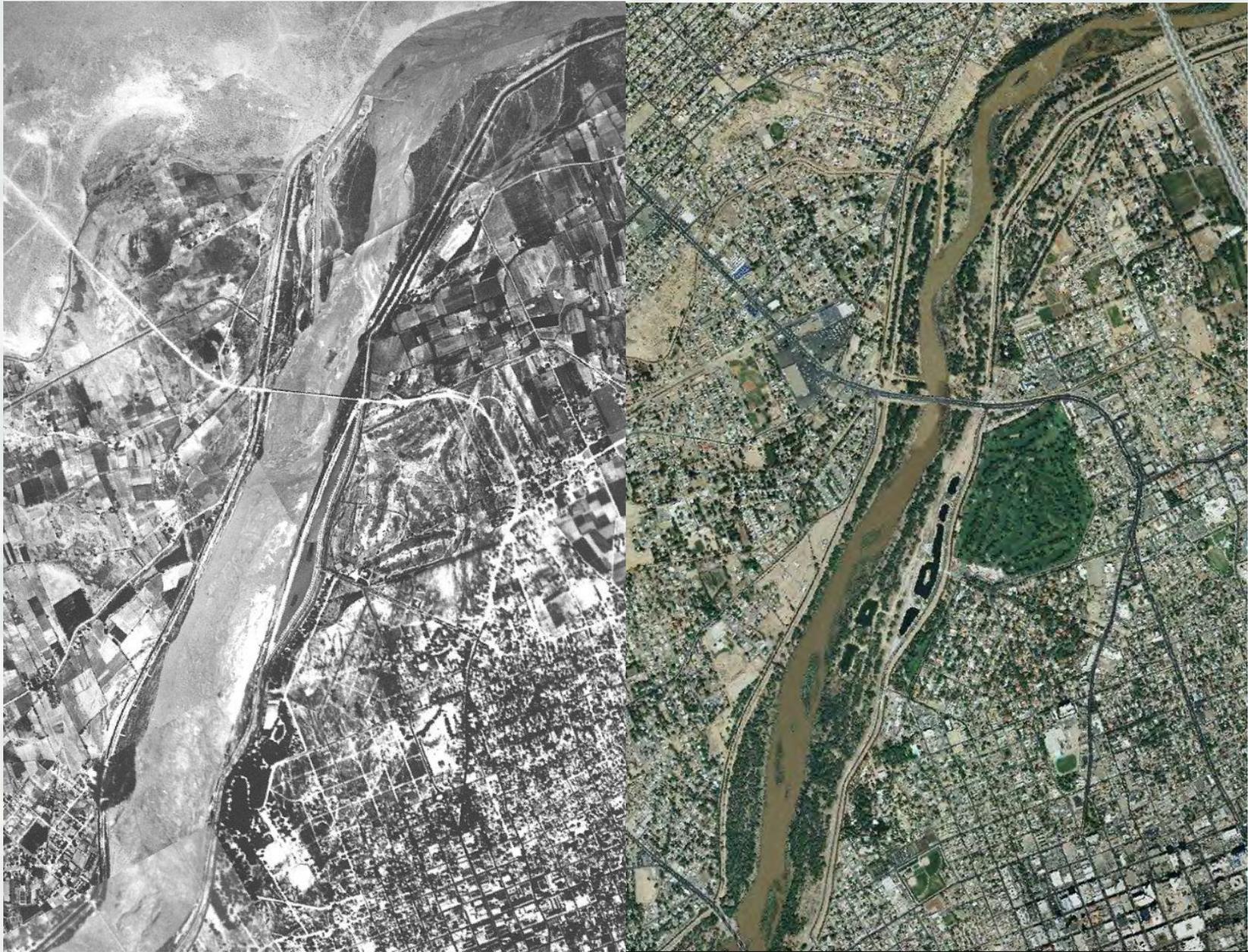
- RG pueblos established ~1300s.
134 pueblos by 1400s.
74 active pueblos in 1600s.
Currently, 19 pueblos in RG Basin.
- 1500s: Navajo, Apache & Southern Ute also settle in basin.
- Cleared vegetation with fire
- Floodplain fields inundated
- Rock-&-brush diversion for irrigation



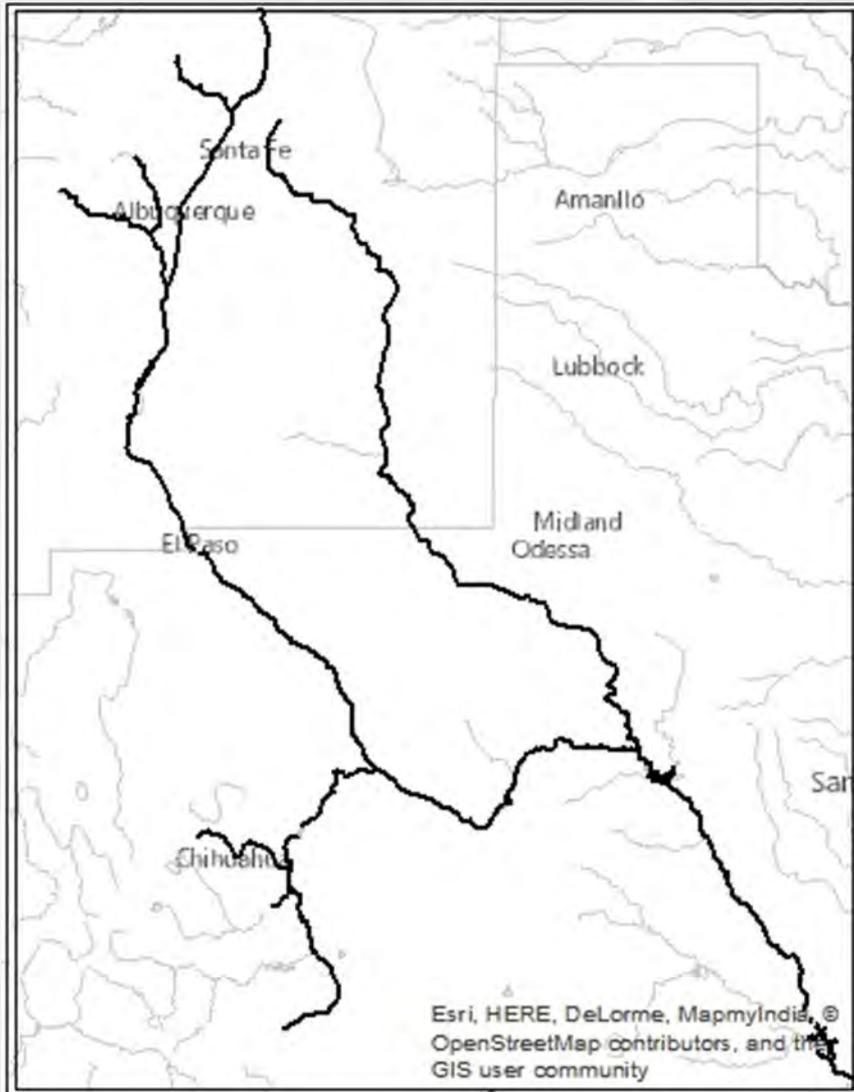
What did the floodplain look like a hundred years ago?

“The only thing that is constant is change.” HERACLITUS OF EPHESUS
Quoted on the Delta Science Plan (2019)

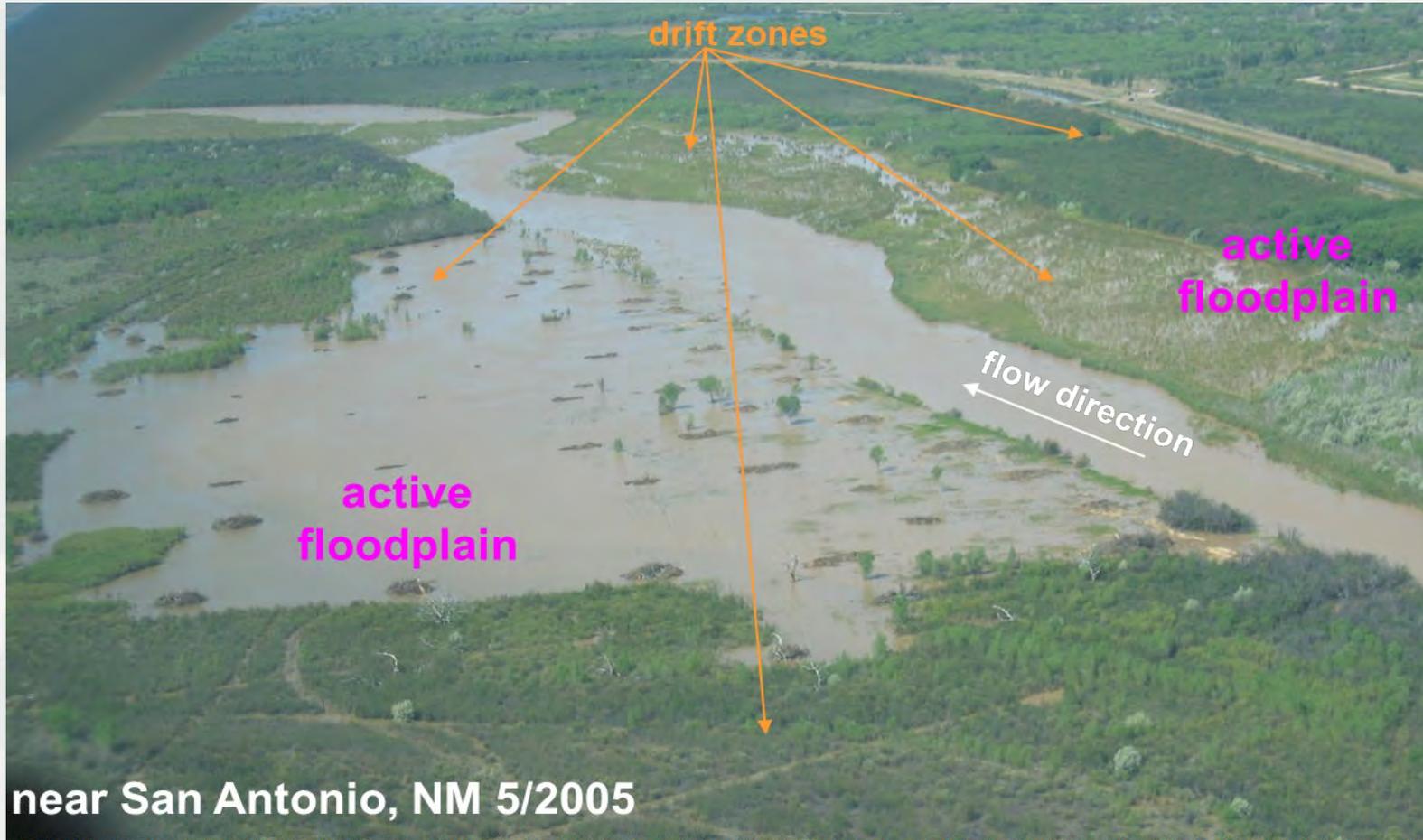




Rio Grande silvery minnow



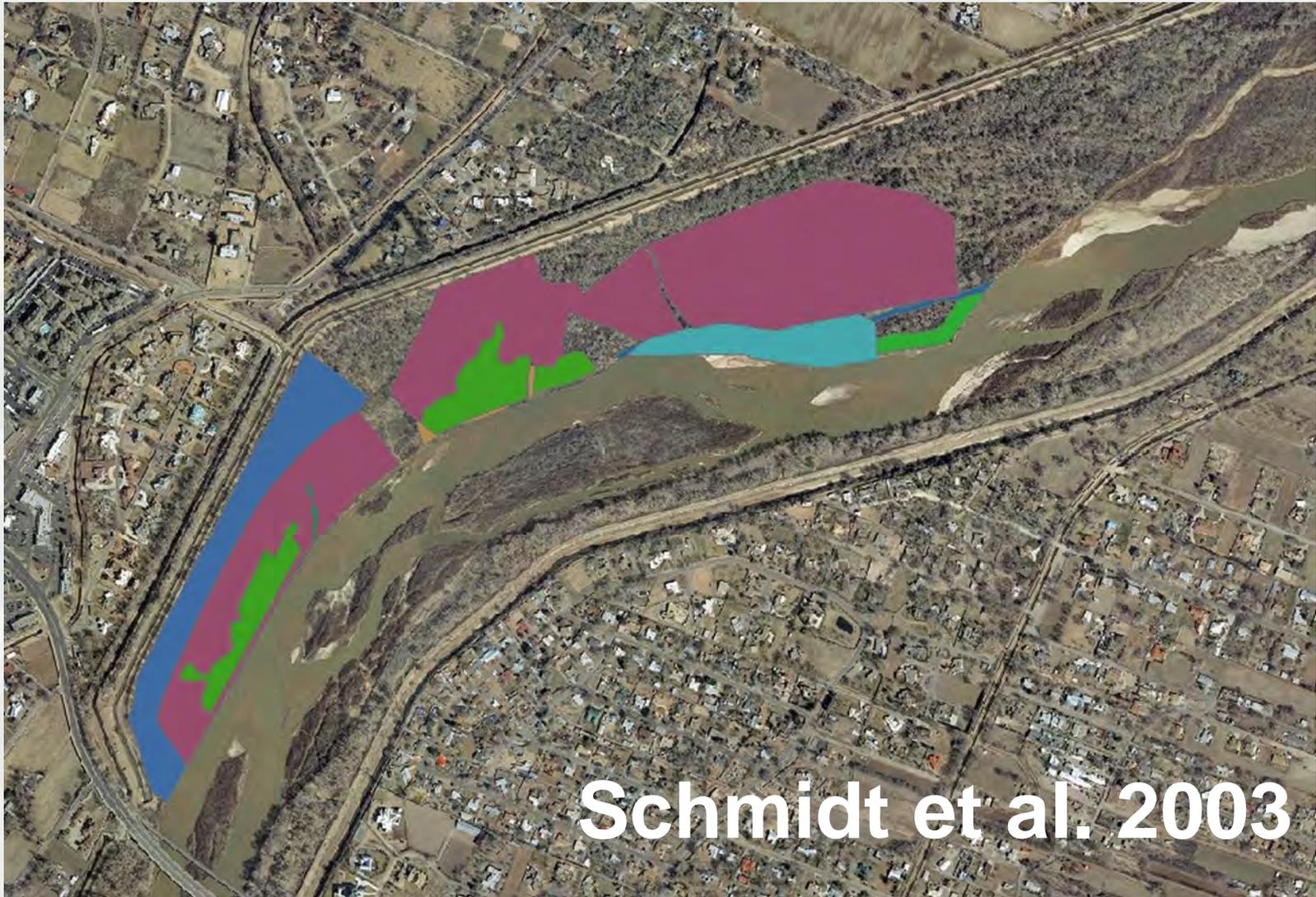
Nursery floodplain habitat



Current concepts for nursery habitat



Fluvial Geomorphology of Rio Grande



Schmidt et al. 2003



How have geological, fluvial, and ecological processes been modified?



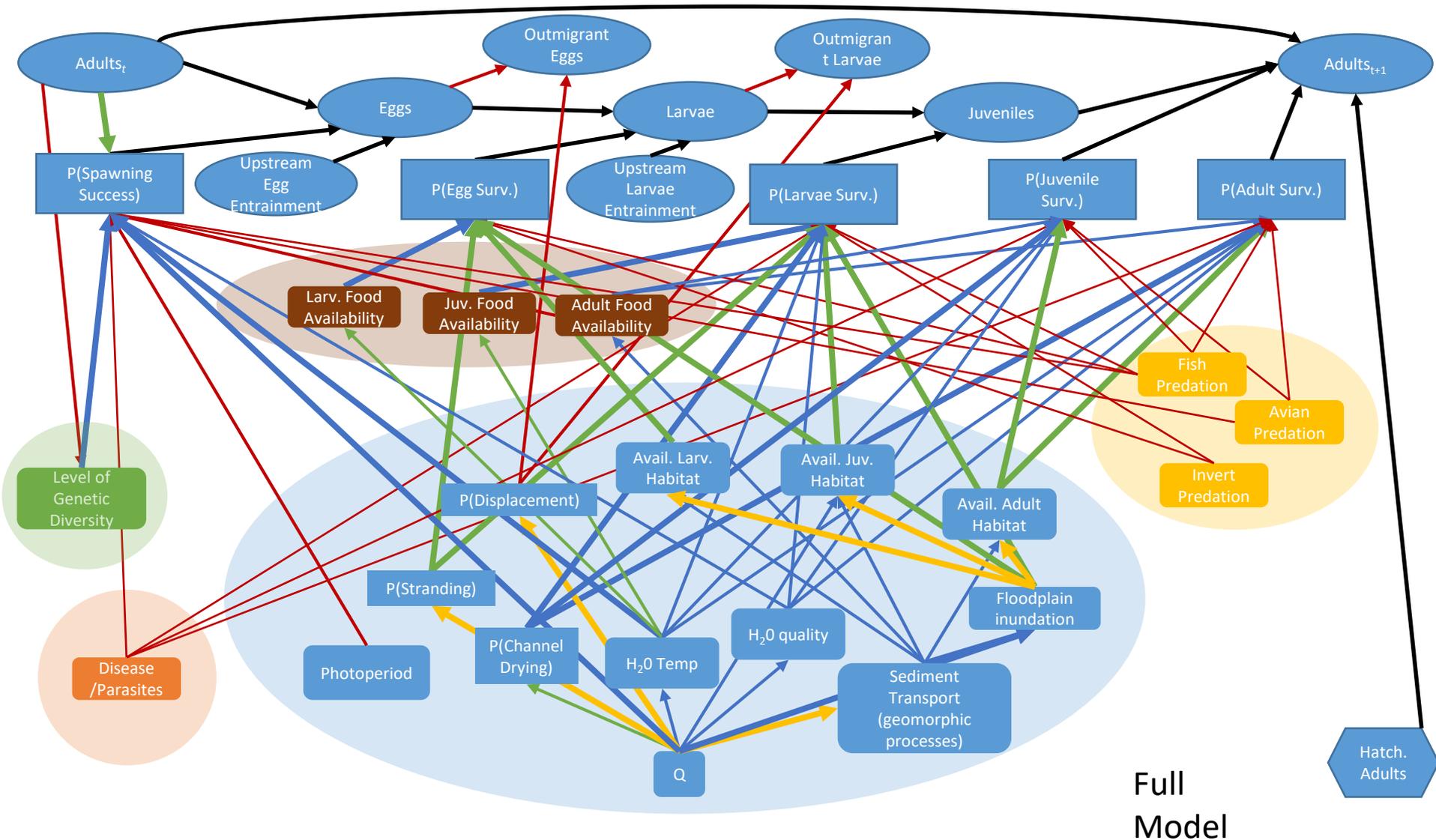
Adaptive Management



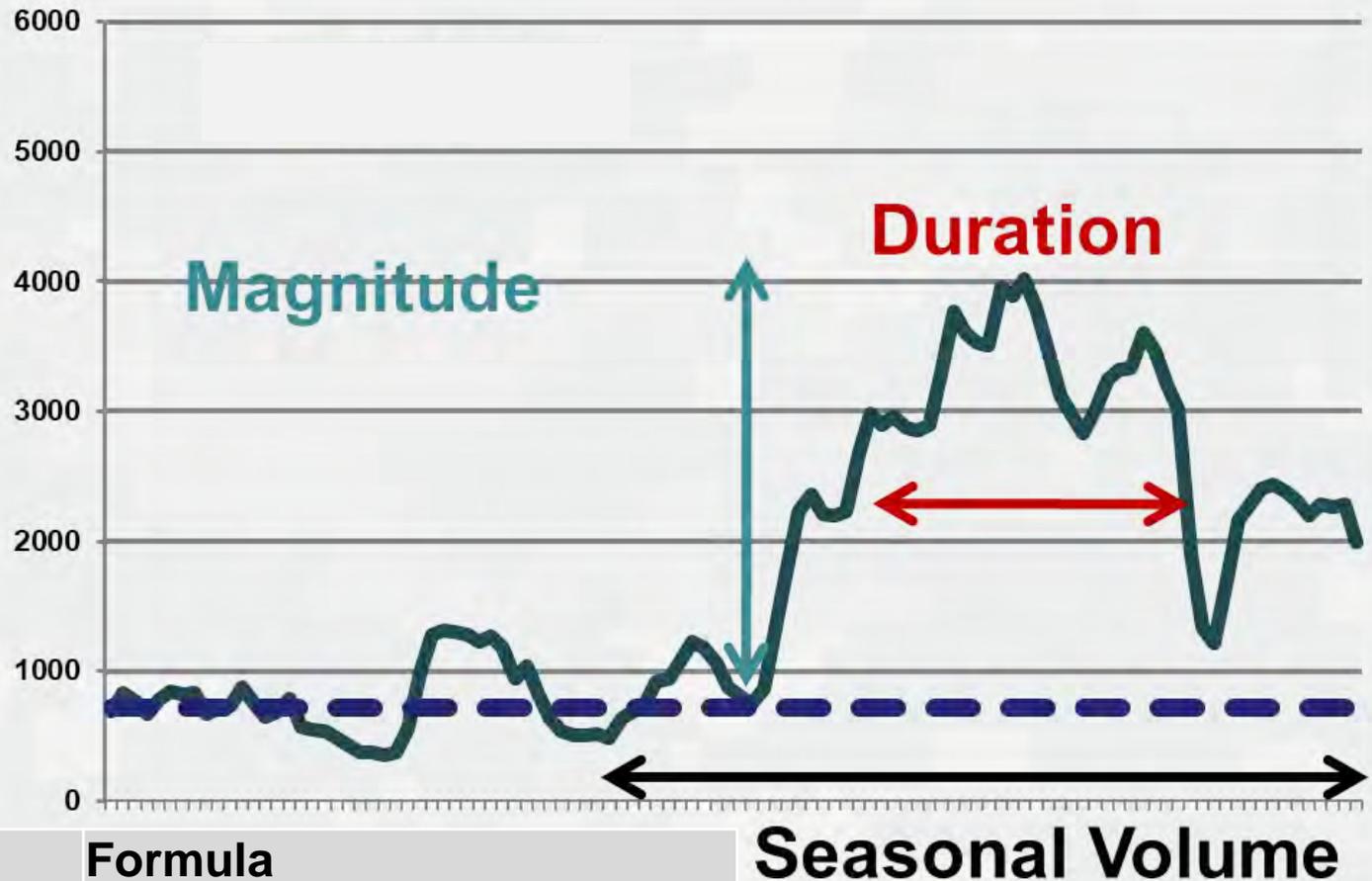
- Design
- Do
- Learn



RGSM Conceptual Model



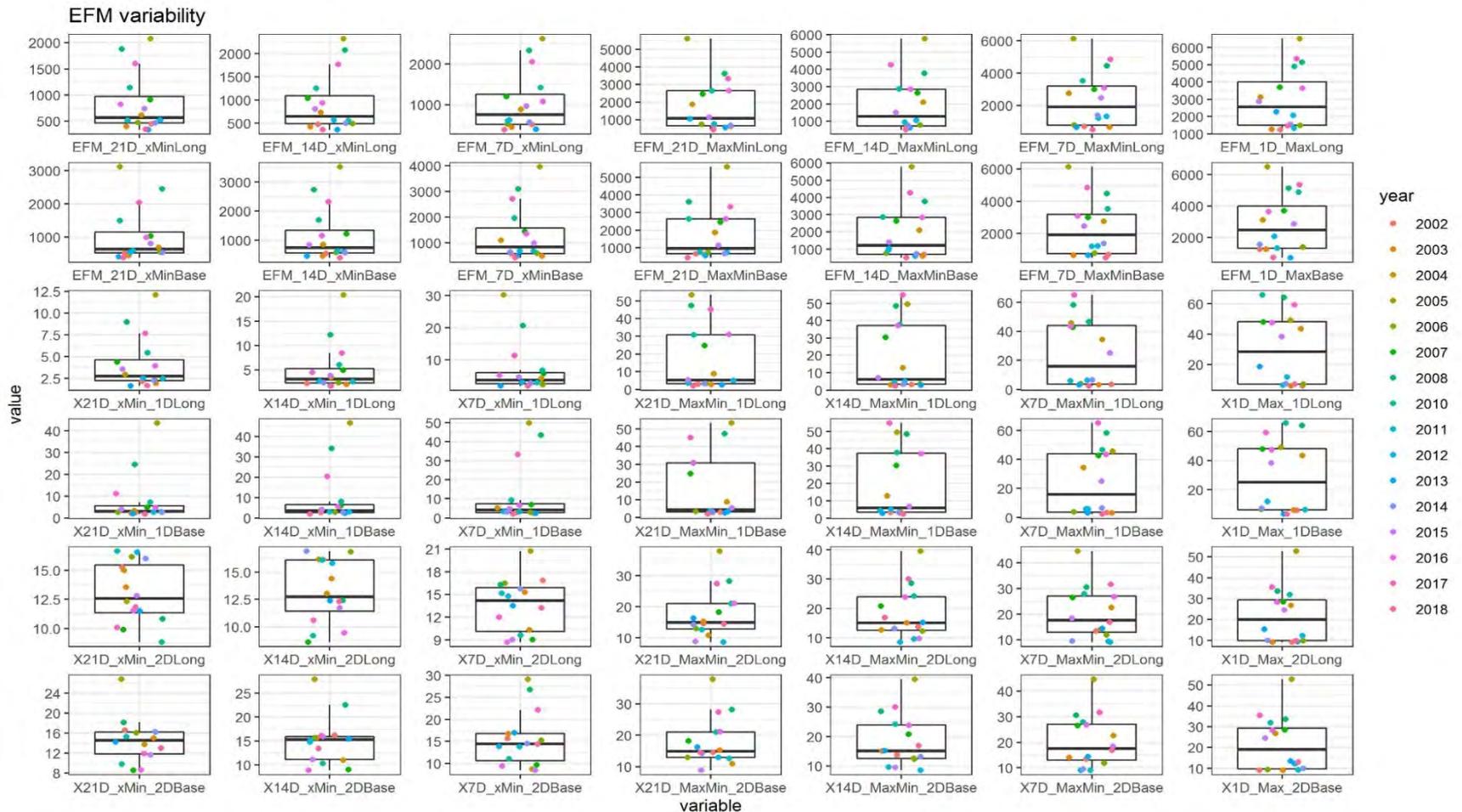
Environmental flow, nursery habitat, fish



Variables	Formula
Brood stock	$\text{fish}/\text{area} * 100$
Young-of-Year	$\text{mean}(\text{fish}/\text{area} * 100)$
Slope geometric	$(\text{fish}/\text{area} * 100) / \text{Date range}$
Fall Index	$\text{fish}/\text{area} * 100$



Autocorrelation and analysis



How has infrastructure changed the Rio Grande?



What to do when silt happens





**Which
processes
can we
imitate?**



Why habitat is a driver for fish populations.





Questions?

